



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,762	01/05/2004	Michael Kagan	3091/52	5357

7590 09/11/2007  
DR. MARK FRIEDMAN LTD.  
C/o Bill Polkinghorn  
Discovery Dispatch  
9003 Florin Way  
Upper Malboro, MD 20772

EXAMINER
----------

GOODCHILD, WILLIAM J

ART UNIT	PAPER NUMBER
----------	--------------

2145

MAIL DATE	DELIVERY MODE
-----------	---------------

09/11/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/750,762

Applicant(s)

KAGAN ET AL.

Examiner

William J. Goodchild

Art Unit

2145

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kagan et al., (hereinafter Kagan), (US Publication No. 2002/0165897).

In reference to claim 1, Kagan teaches a method / system comprising:

writing a doorbell associated with at least one descriptor having a descriptor QP context to a buffer in the NIC [paragraph 4], if said buffer is full, dropping at least one doorbell from said buffer, thereby allowing a write of a new doorbell to said buffer [paragraph 13, lines 11-18], and if said buffer is not full, executing each descriptor associated with said written doorbell in order of descriptor posting by the user, whereby the method enables unrestricted user-level access to the NIC [paragraph 5].

In reference to claim 2, Kagan teaches the method / system of claim 1 wherein: said step of executing each descriptor is preceded by the step of reading said QP context to verify access rights for said descriptor, thereby providing a QP context read response [paragraph 58, lines 13-19].

In reference to claim 3, Kagan teaches the method / system of claim 1 wherein: recovering each said dropped doorbell, thereby obtaining a recovered doorbell [paragraph 13, lines 11-18]; and executing each descriptor associated with said recovered doorbell [paragraph 13, lines 11-18].

In reference to claim 4, Kagan teaches the method / system of claim 1 wherein: storing a respective doorbell associated with each said descriptor in said doorbell buffer [paragraph 54, lines 1-5], reading said QP context of each said descriptor [paragraph 54, lines 10-17], checking if said doorbell is a repeat doorbell, and if no [paragraph 14], executing each said descriptor [paragraph 54, lines 10-17].

In reference to claim 5, Kagan teaches the method / system of claim 3 wherein: checking if a doorbell was dropped, and if yes [paragraph 58], reading said doorbell record [paragraph 58], checking if a software doorbell counter is larger than a hardware doorbell counter, and if yes [paragraph 58], scheduling the execution of one or more descriptors on a relevant queue pair associated with said doorbell record [paragraph 58].

In reference to claim 6, Kagan teaches the method / system of claim 5 wherein: said buffer is a first-in first-out (FIFO) buffer [paragraph 56].

In reference to claim 7, Kagan teaches the method / system of claim 4 wherein: said step of executing each descriptor further includes dropping repeat doorbells found in said checking if said doorbell is a repeat doorbell [paragraph 14].

In reference to claim 8, Kagan teaches the method / system of claim 1 wherein: said NIC is connected to an InfiniBand fabric, and wherein said at least one descriptor is a work queue element (WQE) [paragraphs 6 and 8].

In reference to claim 9, Kagan teaches a method / system comprising:  
providing a single logical communication path common to doorbell writes and context read responses [paragraph 7], and facilitating unsynchronized, kernel-call-free, unrestricted traffic along said single common path, whereby the method enables unrestricted user-level access to a network interface adapter without having to use kernel calls [paragraph 7].

In reference to claim 10, Kagan teaches the method / system of claim 9 wherein: writing a doorbell associated with at least one descriptor to a doorbell buffer in said NIC [paragraph 4], dropping at least one doorbell from said doorbell buffer, thereby providing space in said buffer for at least one new doorbell [paragraph 13, lines 11-18], and recovering each dropped doorbell and executing its respective associated at least one descriptor [paragraph 5].

Art Unit: 2145

In reference to claim 11, Kagan teaches the method / system of claim 10 wherein: said step of dropping at least one doorbell occurs in response to a first check that indicates said doorbell buffer is full [paragraph 13, lines 11-18].

In reference to claim 12, Kagan teaches the method / system of claim 10 wherein: said step of recovering each dropped doorbell includes recovering each dropped doorbell from a system memory [paragraph 13, lines 11-18].

In reference to claim 13, Kagan teaches the method / system of claim 10 wherein: said doorbell buffer is a first-in first-out (FIFO) buffer, and wherein said dropping of at least one doorbell from said doorbell buffer includes dropping a last doorbell input into said FIFO buffer [paragraph 56].

In reference to claim 14, Kagan teaches the method / system of claim 10 wherein: said buffer is a first-in first-out (FIFO) buffer, wherein said writing a doorbell associated with at least one descriptor to a doorbell buffer includes writing a last doorbell to said FIFO buffer, and wherein said dropping of at least one doorbell from said doorbell buffer includes dropping a first doorbell from said FIFO buffer [paragraph 56].

In reference to claim 15, Kagan teaches a method / system comprising:  
a NIC configured to accept doorbell rings and context read responses through a single logical path [paragraphs 7 and 52], at least one host central processing unit

Art Unit: 2145

(CPU) running at least one application, said at least one CPU connected to the NIC through an interface bus, said application operative to write descriptors associated with said doorbell rings and to update a doorbell record in a system memory, said single logical path passing through said interface bus [paragraph 52]; and a kernel call-free mechanism for facilitating free traffic along a said single logical path, whereby said NIC configuration removes the need for a separate context storage memory attached to the NIC and whereby said kernel call-free mechanism allows a practically unlimited number of users to access the NIC simultaneously without a kernel call [paragraph 52].

In reference to claim 16, Kagan teaches the method / system of claim 15 wherein: said NIC configuration includes a buffer for temporarily storing said doorbells [paragraph 54], and wherein said kernel call-free mechanism includes a doorbell dropping mechanism for dropping at least one doorbell from said buffer if said buffer is full [paragraphs 54 and 57], and a recovery mechanism for recovering dropped doorbells and for executing their respective associated descriptors [paragraph 57].

In reference to claim 17, Kagan teaches the method / system of claim 15 wherein: said buffer is a first-in first-out (FIFO) buffer [paragraph 56].

In reference to claim 18, Kagan teaches the method / system of claim 15 wherein: said doorbell recovery mechanism includes a software doorbell counter and a hardware doorbell counter, and means to compare between said two counters [paragraph 58].

Art Unit: 2145

In reference to claim 19, Kagan teaches a method / system comprising:  
responsive to a first check, dropping at least one doorbell from the doorbell buffer if the buffer is full, thereby providing space in the buffer for a respective at least one new doorbell [paragraph 13, lines 11-18]; recovering each dropped doorbell and executing its respective associated descriptors [paragraph 13]; and responsive to same said first check, if said doorbell buffer is not full, checking if a doorbell is a repeat doorbell, and executing descriptors of each doorbell found to be not a repeat doorbell [paragraphs 14 and 54].

### ***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Goodchild whose telephone number is (571) 270-1589. The examiner can normally be reached on Monday - Friday / 9:00 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Cardone can be reached on (571) 272-3933. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2145

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

WJG  
09/04/2007



JASON CARDONE  
SUPERVISORY PATENT EXAMINER